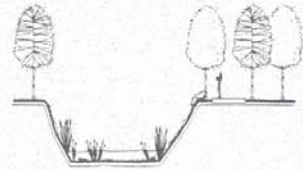


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MILPITAS TRAILS  
MASTER PLAN



**APPENDIX**

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## APPENDIX

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### Design and Management Guidelines

The Design and Management Guidelines included in this Appendix were originally developed for the *1995 Santa Clara County Trails Master Plan* to provide direction on the implementation of those trails identified within that plan. The Design and Management Guidelines included the Regional Trails identified in both the *1995 Santa Clara County Trails Master Plan* and the Milpitas Trails Master Plan. The Regional Trails within Milpitas are Coyote Creek Trail/San Francisco Bay Trail/Juan Bautista de Anza Trail and the Bay Area Ridge Trail.

The City of Milpitas has chosen to adopt and apply these Design and Management Guidelines to the development of all trails within the City. These include Regional, City and Neighborhood Trails and On-Street Connector Routes. The County Guidelines supplement the cross-sections used to categorize the trail system developed for Milpitas (See *Figures 3-6*).



## **DESIGN AND MANAGEMENT GUIDELINES**

### **OVERVIEW**

#### **PURPOSE**

The Trails Master Plan Map identifies hiking, horseback riding, and bicycling trails that support a myriad of trail-related uses. The system of trails identified on the Trails Master Plan Map crosses many types of terrain and passes through virtually every type of urban and rural land use in the County.

These guidelines provide direction to the County for the implementation of new trails, recognizing that it would be impossible to anticipate every situation. These guidelines are a general guide, rather than a specific formula for success. Each new trail route should be evaluated on a case-by-case basis, taking into account actual field conditions and trail route / land use relationships.

Except as noted in the "Environmental Review Considerations" below, these guidelines are not absolutes. The guidelines provide detailed direction but also recognize the advantages of flexibility to trail suppliers, trail users, and property owners when discussing the site-specific implementation and administration of any trail route shown on the Trails Master Plan Map.

#### **WHO USES THESE GUIDELINES**

These guidelines are intended for use in the unincorporated lands within Santa Clara County for the trail routes depicted on the Countywide Trails Master Plan Map. They specifically apply to all departments and staff of Santa Clara County. Where references are made within several of the guidelines to Cities, Special Districts, or Urban Service Areas, these guidelines are intended to be a model and point-of-reference for those entities. Each of the fifteen Cities within the County and other special districts, and State or Federal Agencies are encouraged to reference and/or adopt these guidelines, where appropriate, as part of their own general plans for major trails.

These guidelines do not substitute or replace any existing codes, rules or regulations of land managing and permitting agencies that may govern trail development, but are in addition to them. For example, the California Department of Fish and Game has jurisdiction over the bed and banks of creeks, streams, rivers and seasonal drainages that have a defined channel. The U.S. Army Corps of Engineers has jurisdiction over creek

channels and wetlands. Necessary permits from these agencies will be obtained when trail alignments result in impacts to their jurisdictional areas.

### **RELATIONSHIP TO COUNTYWIDE TRAIL POLICIES**

Some of the trail policies contained in Section II refer to "Design and Management Guidelines". In this sense, the countywide trail policies reference the need for greater definition concerning the characteristics, use, and safety measures associated with countywide trails -- definitions that provide a level of understanding to trail users and property owners whose lands lie adjacent to countywide trails.

These trail design and management guidelines complement the policies set forth in Section II by identifying:

- how a specific trail route should be sited and designed based on a series of common trail conditions and landscape circumstances found in Santa Clara County; and
- once constructed, how a specific trail within the jurisdiction of Santa Clara County should be managed to provide appropriate levels of maintenance, user safety, and the security and privacy of properties either adjacent to the trail or through which the trail crosses.

### **RELATIONSHIP TO ENVIRONMENTAL REVIEW CONSIDERATIONS**

The Initial Study prepared under the California Environmental Quality Act (CEQA) for this Trails Master Plan Update identified the need for selected trail design and management action policies to mitigate potentially significant impacts. Where the design or management guideline outlined below was developed specifically to mitigate a potential environmental impact, the design or management guideline coding is followed by an asterisk such as "3.5.2 **Cut and Fill\***". Where there is no title involved, an asterisk is used after the coding such as "3.5.2\*". In instances where a guideline has been developed specifically to mitigate a potentially significant environmental impact, use of the words "shall" or "will" is made.

## **ORGANIZATION**

The guidelines are divided into three sections. These are:

- **Design Guidelines:** summarizing physical parameters for siting, designing, and constructing a new trail and the immediate trail setting. Design guideline reference numbers begin with the letter "D".
- **Management Guidelines:** summarizing the managerial parameters for siting and constructing a new trail. Management guideline reference numbers begin with the letter "M".
- **Maps & Figures:** illustrating the physical characteristics of trails and dimensional relationships of a trail to its setting.

## **DESIGN GUIDELINES**

### **D - 1.0 Location**

#### **D - 1.1 Trails and Land Use Compatibility**

**D - 1.1.1\*** Locate trails along property lines where feasible and appropriate in conjunction with the use of the land, to avoid unnecessarily crossing private properties (Also reference: Figure G-12).

**D - 1.1.2\*** Trails shall be sited as far away from occupied dwellings as practical. Trails not within planned road rights-of-way within the County shall be set back from occupied dwellings a minimum distance in accordance with Table G-1. Where setbacks specified in Table V-1 are not feasible, potential noise and privacy impacts must be evaluated and reduced by use of berms, fencing, landscaping and other feasible and compatible means, if necessary.

**Table G-1: Trail Setbacks**

<b><u>Land Use Category**</u></b>	<b><u>Trail Setback from Occupied Dwelling***</u></b>
Urban Service Areas	25 feet
Rural Residential	150 feet
Resource Conservation Areas	
Hillsides	150 feet
Agriculture	300 feet
Ranchlands	500 feet

\*\* See Land Use Map, Santa Clara County General Plan

\*\*\* As measured from the edge of the trail tread



**D - 1.1.3\*** In areas where trails would pass adjacent land uses such as mining, railroads, and defense research and testing facilities, trail structures such as fences, barriers and signing shall be used to deter trail users from leaving the trail and encountering unsafe conditions. When requested by the adjacent property owner, temporary trail closures shall be employed during intermittent operations, such as agricultural spraying or defense rocket testing, that would jeopardize the safety of an otherwise safe trail.

**D - 1.1.4\*** In areas where trail routes are adjacent to private property, visible fencing shall be employed if requested by the adjacent property owner to deter users from leaving the trail. Fencing shall comply with requirements determined under the California Environmental Quality Act. Type of fencing could be wood, 4-strand wire, wire mesh, or chain link and should be determined by the property owner(s).

**D - 1.1.5** Trail alignments should be selected that minimize intersections with motorized vehicles. Where feasible, trail grades should be separated from roadway grades at crossings. Where separated crossings are not possible, at-grade crossings must be designed to equally consider vehicular and trail user safety. (Reference: Figure G-8)

**D - 1.1.6** At the intersections of Shared-use Trails or where off-street bicycle trails intersect with on-street bicycle routes not at a road intersection, there should ideally be a 15' turning radius and 25' sight clearance between the two trail routes.

**D - 1.1.7\*** Whenever new trails are developed within a rail line corridor, the trail alignment should be coordinated with local and regional transportation agencies and located so as not to preclude future multiple-use of the corridor for public mass-transit facilities if such facilities are included in City or County General Plans.

## **D - 1.2 Regional Staging Areas and Land Use Compatibility**

**D - 1.2.1\*** If necessary, space shall be provided for noise-attenuating berms and landscaping that shall be used to reduce noise from reaching sensitive receptors such as residences. Space will be provided for berms and landscaping as necessary to screen views to the staging area from surrounding sensitive receptors such as residences.

**D - 1.2.2** Regional Staging Areas shall be designed to adequately accommodate and manage anticipated use levels to prevent overflow parking onto local neighborhood streets. Ideally, Regional Staging Areas should be located on or near a public transit route.

### **D - 1.3 Trails and Environmental Protection**

#### **D - 1.3.1 General**

**D - 1.3.1.1\*** Trail alignments and their associated facilities shall be sited and designed to be in harmony with surrounding natural and cultural settings and to retain natural appearances and values.

**D - 1.3.1.2\*** Existing native vegetation shall be retained by removing only as much vegetation as necessary to accommodate the trail clearing width.

**D - 1.3.1.3\*** Trail design shall include barriers to control trail use and prevent environmental damage; barriers may include fences, vegetation, stiles, and/or fallen trees or branches as appropriate.

**D - 1.3.1.4\*** Biological resource assessments shall be conducted as specific trail routes outside of urban areas are implemented. These assessments will include mitigation recommendations as appropriate.

#### **D - 1.3.2 Special Status Species Habitats**

**D - 1.3.2.1\*** To the maximum extent feasible, trail alignments shall avoid impacts to known special status plant and animal habitats. Trail alignments shall be evaluated on a case-by-case basis by a professional biologist to identify impact avoidance measures or mitigation measures for biotic impacts. Consideration shall be given to: rerouting the trail; periodic closures; revegetation prescriptions including replacement vegetation based on habitat acreage or plant quantity; buffer plantings; and other appropriate measures. Removal of mature native vegetation shall be avoided as much as possible to protect the productivity of the landscape and the aesthetic quality of the trail. The appropriate resource agencies will be contacted for consultation regarding any trail alignments that are identified as having potential significant impacts to special status species or their habitat.

**D - 1.3.2.2\*** In special status species habitat areas, trail use levels shall be limited as appropriate to ensure protection of resources. Techniques for limiting use may include, but are not limited to:

- physical access controls
- seasonal or intermittent closures
- restricted use permits
- exclusion of domestic pets

**D - 1.3.2.3\*** Existing access routes and levees shall be used wherever possible to minimize impacts of new construction in special status species habitats.

**D - 1.3.3 Washes, Freshwater Streams, Riparian Zones, and Wetlands**

**D - 1.3.3.1\*** When parallel to a stream or riparian zone, new trails shall be set back a minimum of 100 feet from the top of bank or from the outside edge of the riparian zone, whichever is greater as measured from the edge of the low flow channel, except where topographic, resource management, or other constraints or management objectives make this infeasible or undesirable. Examples of possible exceptions to this requirement include where prime agricultural land would be converted to a non-agricultural use, at drainage crossings, passing under bridges, or where the trails are on an existing flood-control structure (e.g., levee or filled bank). Based upon advice of a professional biologist and concurrence of reviewing agencies, riparian setbacks may be adjusted on a case-by-case basis.

**D - 1.3.3.2\*** Trails in foothill and mountain accessibility zones (Reference Map G:1: Accessibility Zones) within 100 feet of a riparian zone shall be composed of natural materials or shall be designed (e.g. a bridge or boardwalk) to minimize disturbance and need for drainage structures, and to protect water quality (Reference: Figures G-11 and G-12).

**D - 1.3.3.3\*** Trail crossings of freshwater stream zones and drainages shall be designed to minimize disturbance, through the use of bridges or culverts, whichever is least environmentally damaging. Bridges and culverts shall be designed so that they visually and functionally blend with the environment.



**D - 1.3.3.4** New vegetation should be planted in the setback zone, where practical, to complement existing riparian growth.

**D - 1.3.3.5\*** Trails will avoid wetlands, including seasonal wetlands, wherever possible. Use of existing levees and levee maintenance roads is to be emphasized. A wetlands biologist will conduct reconnaissance level surveys of all trail alignments in areas with potential wetlands. Trails adjacent to wetland areas will be constructed so that trail fills avoid wetland impacts. A formal wetland delineation will be required along trails that may impact wetlands.

**D - 1.3.3.6\*** Revegetation and/or enhancement will be undertaken where any sensitive habitat or special status species habitat will be disturbed or destroyed by trail construction. The design of an appropriate revegetation program shall fully compensate for the lost habitat, with no net loss of habitat functions and values. The revegetation program should be designed by a qualified biologist, submitted to the appropriate regulatory or trustee agency (usually the Department of Fish and Game) for approval, and implemented prior to or concurrently with the trail development. At a minimum, the revegetation program will include a description of project impacts, mitigation calculations, the mitigation site, revegetation techniques, maintenance measures, a long-term monitoring program, and contingency measures. Riparian and wetland habitat impacts will typically be mitigated at a 3:1 ratio for high quality habitat areas, and at lower ratios where lower habitat quality justifies a lower ratio. A lower ratio may also be justified if habitat mitigation is implemented prior to the occurrence of impacts. Mitigation will be based on in-kind replacement of impacted habitat with habitat of equal or better biotic value. Native plant materials will be utilized in all mitigation work.

**D - 1.3.4 Other Habitat Areas:** In other areas no specific setbacks are required. However, at a minimum, all trail alignments should be reviewed in the field by a professional biologist prior to construction.

**D - 1.3.5 Watersheds:**

**D - 1.3.5.1\*** Within watersheds of water supply reservoirs, new

equestrian trails shall not be sited parallel to "blue line" streams within 150 feet of the bank of the streams. Where equestrian trails must cross streams, the trail shall be sited perpendicular to the stream (to the extent allowed by topography and vegetation) through the 300-foot buffer zone (150 feet on each side) in order to minimize the distance of the trail within the buffer zone. This measure may be modified on a case-by-case basis upon the advice of a professional biologist or water quality specialist and the concurrence of the SCVWD or other water agencies as applicable. (For example, where it makes sense to use the top of an existing levee as an equestrian trail rather than constructing a new trail in otherwise undisturbed habitat, it may be possible to achieve the same objective of minimizing potential water pollution by sloping the top so that drainage would be directed toward the landward side of the levee rather than toward the water body.)

**D - 1.3.5.2\*** When siting new equestrian trails near water supply reservoirs, trails shall not be located within 150 feet of the high water line of the reservoir. This requirement may be modified on a case-by-case basis upon the advice of a professional biologist or water quality specialist and the concurrence of the SCVWD or other water agencies as applicable.

**D - 1.3.5.3\*** For all new trail routes proposed in watersheds of water supply reservoirs, the County Parks Department will consult with the SCVWD or other water agencies as applicable regarding water quality protection. When the reservoir watershed management plans are completed, the guidelines for water quality protection shall be considered as applicable for trails proposed within these watersheds.

**D - 1.3.6 Wildland Fire\*:** Siting criteria used to establish detailed trail alignments shall include the following:

- Avoidance of existing vegetation patterns in terms of their fuel characteristics, such as ease of ignition, relative flammability, fuel load, responsiveness to suppression actions, and ramifications if the vegetation should burn. Where alternate alignment siting is available, the alignment with the least flammable vegetation should be given priority.

- Siting trails across steeper slopes that make emergency access either for fire or medical emergencies more difficult and that are more potentially hazardous relative to fire behavior should be avoided.
- Provide emergency access opportunities to and along trails in terms of the trail width supporting the movement of ground equipment or personnel, as well as airborne equipment and landing sites.
- Development feasibility of potential new emergency water supplies along a trail in terms of availability of water, access for vehicles to draft from the water source, and cost of development / maintenance of the water supply.

During preparation of detailed design and management plans for trails in Very High and High Fire Hazard Severity Zones, final trail alignments and access points should be located, where feasible, so that the trails may also serve as access routes (for patrol, fire suppression, or emergency medical transport) and as fuel/fire breaks (to optimize fire containment and control operations or fuel management activities). Emergency access/egress points should be located approximately every 2 miles along the trail and provide either access for ground vehicles or helicopter landing sites.

**D - 1.4 Hillside Scenic / Aesthetic Resources\*:** Trail alignments across the face of open hillsides and near the top of ridgelines shall be sited to avoid creating permanent, noticeably visible lines on the existing landscape when viewed from points looking up at or perpendicular to the trail. Criteria to be used in siting the trail includes, but is not limited to: avoidance of excessive cuts in slopes that could not be effectively revegetated; presence of native soil to support revegetation; and placement of trail alignments on cross-slopes less than 45%.

**D - 1.5 Areas of Geologic Instability\*:** Appropriate surveys shall be conducted as part of trail route site planning to identify the occurrence of any potentially hazardous geologic conditions. Such areas shall be avoided or necessary construction design measures will be incorporated into the design of the trail to assure that users will not be exposed to the identified hazard.



**D - 1.6 Emergency Access\*:** During trail implementation, planners should locate final trail alignments and access points to allow the trails to also serve as emergency access routes (for patrol or emergency medical transport). For more remote trails, emergency access points should be located, where feasible, approximately every two miles along the trail and provide either access for ground vehicles or helicopter landing sites.

## **D - 2.0 Trail Design**

**D - 2.1 Trail Setting:** The public lands or easements that comprise the trail setting should provide width sufficient for management and/or buffer space from adjacent uses so as not to preclude the viability of those uses. Table G-2 lists optimum widths for trail settings based on land use designations within the County. However, in no case should a trail route width be less than that outlined in the County's Trail Easement Dedication Policies and Practices (January, 1992). Where any more than the 25 feet permitted by the Trail Easement Dedication Policies and Practices is required, the additional lands shall be purchased or otherwise acquired with the consent of the property owner.

**Table G-2: Trail Settings**

<b>Land Use**</b>	<b>Optimum Trail Route Width</b>
Urban Service Areas	25 feet
Rural Residential	50 feet
Resource Conservation Areas	
Hillsides	50 feet
Agriculture	100 feet
Ranchlands	100 feet

\*\* See Land Use Map, Santa Clara County General Plan

### **Trail Easement Policies and Practices (Board of Supervisors, January, 1992)**

The Parks Department usually requests a twenty-five foot wide easement to accommodate such uses as hikers, equestrians and bicyclists and to allow for variations and obstructions such as trees and utilities. In addition the twenty-five feet provides a buffer between the constructed trail and the private property. That does not mean that the trail that will eventually be developed will be twenty-five feet wide, but rather that within that twenty-five foot easement there is a reasonable likelihood that a feasible trail route can be accommodated. The actual width of the constructed trail is usually five to ten feet wide depending on the terrain and anticipated uses.

Working with the landowner in the field, County Parks staff will determine the most appropriate location and width for the trail easement. In all cases the exact location of the easement will be negotiated with the landowner. Once an agreement is made between Parks staff and the landowner, the landowner will work with their engineer to draft the legal



description of the trail which will then be documented as needed for recordation. Once a trail has been constructed, the County would return the unneeded portion of the easement to the landowner at the landowner's request. Factors that may affect the ultimate width of a trail easement are discussed below:

1. Where other restrictions (such as scenic highway setbacks) and/or utility easements limit the landowner's placement of structures on the parcel, County Parks staff will overlap the easement within this area to minimize restrictions to development. Often the width of a utility easement will be less than twenty-five feet. Where possible, the Parks Department will make the width the same as the underlying easement for ease of legal processing.
2. Where rural roadside trails are involved which are not proposed to be part of a major regional trail the Parks Department may request an easement only ten to fifteen feet wide.
3. Where major regional trails or streamside trails are involved, the Parks Department would want to retain the entire twenty-five foot easement in order to provide for higher levels of future use and/or provide greater flexibility in protecting riparian resources.
4. In rare instances the terrain may be so steep, the soils conditions so unstable or the biological or cultural (historical and archaeological) resources so unique that a wider trail easement may be requested.
5. Trail easements less than ten to fifteen feet wide are likely to prove problematic both for the County and for the landowner. For example, if the easement is too narrow and heavy rains or minor land slippage cause a portion of a trail to wash out, it may be difficult to repair or replace the trail within the narrow easement. Similarly, narrow easements are more vulnerable to being blocked by the encroachment of structures, fences, or landscaping.
6. In instances where the land subject to trail easement is located on a slope of ten percent or less, the easement shall not exceed fifteen feet, unless special circumstances are found to be present. Special circumstances which would support an easement of up to twenty-five feet include but are not limited to the following: the need for a fire break, a landscape buffer, or to accommodate multiple recreational uses. In these instances, it is the responsibility of County staff to establish the special circumstances which justify the additional footage required.

## **D - 2.2 Tread Width**

**D - 2.2.1** Trail tread width should be determined by amount and intensity of trail use and field conditions such as topography, vegetation and sensitivity of environmental resources. Where treads are narrow (5 feet or less ), occasional passing areas must be provided at places with gentle slopes. (Reference: Figures G-2, G-3, G-4, G-5, G-7)

**D - 2.2.2** Shared-use, natural tread, double track trails should be designed as two-

way paths as shown in Figure G-3. Where paved, the paved portions of a Shared-use Trail should have an optimum width of 12 feet with a center stripe and minimal 2-foot, flush gravel shoulders or clear space on each side of the trail. (Reference: Figures G-2, G-3)

**D - 2.2.3** Limited-use Trail treads should be designed as two-way paths with an optimum width of 6 feet. (Reference: Guideline Figure G-4, G6)

**D - 2.2.4** Single-purpose Trail treads should be an optimum of 4 feet wide. (Reference: Guideline Figure G-5, G6)

**D - 2.3 Trail Grades:** Grades along trail treads should be held to a minimum. Grades of 10% or less are desirable; grades may be as great as but not greater than 12.5% without use of switchbacks. Where grades exceed 10%, long, gradual switchbacks should be used rather than short, steep switchbacks.

#### **D - 2.4 Accessible Trails**

**D - 2.4.1** Where feasible, the design of countywide trails should recognize the intent of the American With Disabilities Act (ADA) and should emphasize accessibility for everyone. To determine feasibility and the degree to which trails will be designed for whole-access, the overall terrain conditions of the area surrounding the trail route will be referenced. As an initial reference, three general accessibility zones are illustrated on Map G-1. These zones are: Valley Floors; Foothills; and Mountains. Table G-3 defines the general slope characteristics of each of these zones. The final definition of each zone as it pertains to a particular trail alignment should be made only after detailed site investigations have been conducted.

**Table G-3: Ranking Access Conditions by Topography**

Criteria	Accessibility Zone*		
	Easy Level of Access (e.g. Valley Floor)	Moderate Level of Access (e.g. Foothills)	Difficult level of Access (e.g. Mountains)
Average slope conditions over entire area of trail	< 10%	11% - 20%	> 20%

\* See Map G-1: Accessibility Zones for generalized interpretation

**D - 2.4.2** Table G-4 summarizes trail design criteria to be used for the three general accessibility zones delineated on Map G-1. All countywide trail routes in unincorporated County jurisdiction within the Valley Floor zone should be designed to meet guidelines presented in Table G-4. Trails within Foothills and Mountain zones should be evaluated on a case-by-case basis.

**Table G-4: Summary of Accessible Design Guidelines for Trails<sup>(1)</sup>**

Design Component	Accessibility Zone*		
	Easy Level of Access (e.g. Valley Floor)	Moderate Level of Access (e.g. Foothills)	Difficult level of Access (e.g. Mountains)
Maximum running slope	8.33%	10%	12.5%
Maximum interval of 5' by 5' passing areas**	200 '	300 '	400 '
Optimum trail tread	5'-0"	5'-0"	4'-0"
Rest area interval	600'	900'	optional
Maximum ramp gradient	10%	12.5%	15%
Maximum ramp rise to landing	48 "	60 "	72 "
Maximum ramp run to landing	40 '	40 '	40 '
Maximum tread cross-slope	3%	5%	5%
Minimum vertical clearance***	6'-8"	6'-8"	6'-8"

(1) Based on guidelines developed in cooperation with Federal agencies by PLEA inc.

\* See Accessibility Zone Map for generalized interpretation of area coverage

\*\* Not required if trail is a minimum of 5' in width

\*\*\* Single-purpose Hiking Trail Only (Reference: Guideline Figure G-5)

**D - 2.5 Sight Distance:** Clearing widths of Shared-use and Limited-use trails involving bicycles should be developed to assure a 100-foot average sight distance where possible. If sight distances on curves, around hills or through densely vegetated areas are less than



100 feet, safety signs and reduced speed limits should be considered.

**D - 2.6 Trail Undercrossings:** Where a countywide trail must pass under a highway bridge, sufficient vertical clear-space and security lighting should be provided to accommodate trail use. Where practical, optimum horizontal dimensions as shown in Figure G-7 should be provided. Where the provision of such spaces is not possible, alternative pavement textures should be provided and safety signs placed on either side of the undercrossing involved to inform trail users of such conditions and the appropriate use conditions to follow, such as reducing speeds or dismounting.

### **D - 3.0 Trail Materials and Construction Practices**

#### **D - 3.1 General**

**D - 3.1.1** Machine construction of trails is the most cost-effective in the majority of cases. Hand construction of trails is preferable where opportunities for use of volunteer labor exist or where potential impacts to land or habitat resources, and subsequent mitigation costs, would be exacerbated by machine construction.

**D - 3.1.2** Trail development should require the minimum construction necessary to provide for public safety and protect natural and cultural resources.

**D - 3.2 Construction Limits:** Visible evidence of trail construction should be confined to the trail clearing limit.

**D - 3.3 Clearing Width:** The minimum horizontal clearing width from physical obstructions varies based on the type of trail but shall be no less than 2 feet from the outer limits of the trail tread. Minimum vertical distance from overhanging branches shall be 12 feet on Shared-use Trails, Limited-use Trails, and Single-use Trails for equestrian or bicycles. Minimum vertical distance from overhanging branches shall be 7 feet on Single-use hiking trails.

#### **D - 3.4 Trail Surfaces**

**D - 3.4.1** Where feasible, trail treads should be of materials that provide a firm, smooth surface meeting requirements and guidelines of the ADA.

**D - 3.4.2\*** Trail surface appropriate to intended use shall be selected so as to minimize runoff and erosion problems.



### **D - 3.5 Grading and Drainage**

**D - 3.5.1 Extent of Grading\*:** No large-scale grading shall be used for trail construction unless in conjunction with a development project where large-scale grading has been found acceptable.

**D - 3.5.2 Cut and Fill\*:** The degree of cut allowed on a slope depends on the soil type, hardness, and surrounding natural resources. Ultimate cuts shall be contoured to blend with the natural slopes. Berms of earth, rocks or wood on the outside of the trail may be necessary. Steep areas shall be handled by limited terracing or building steps to avoid large-scale grading. Steps must be reinforced with stone or wood. (Reference: Figures G-9, G-10)

**D - 3.5.3 Soil Disturbance\*:** In order to reduce erosion and maintenance problems, disturbance of the soil surface shall be kept to a minimum. Only those rocks, stumps, and roots which interfere with safe passage shall be removed.

**D - 3.5.4 Drainage\*:** Trail designs shall comply with the current County Drainage Manual. Surface water shall be diverted from trails by outsloping the trail tread between 1% and 3% where feasible. Where necessary, shallow ditches or water bars shall be used to divert water on running slopes greater than 5%. (Reference: Figure G-9)

**D - 3.5.5 Erosion Control Plans\*:** Where a potential for significant soil erosion exists along a new trail alignment, specific erosion control plans shall be developed by a Registered Civil or Soils Engineer as part of the trail construction documentation. Criteria to be used in determining the erosion potential includes: slope, soil type, soil composition and permeability, and the relative stability of the underlying geologic unit as identified on the County Planning Department's *Relative Seismic Safety Map*.

**D - 3.6 Planting of Disturbed Areas\*:** Any cut or fill slopes shall be immediately reseeded or replanted with vegetation native to the general area. Criteria that would be used in selecting plant materials include, but is not limited to: if the species is indigenous to the area; habitat value; rate of growth; ultimate size; fire resistance; strength of root system; resistance to pests and diseases; aesthetic characteristics; ability to provide shade; and ease of maintenance. Noxious plants (e.g. Yellow Star Thistle) shall be controlled within the trail setting.

**D - 3.7 Cultural Resource Protection\*:** Trail design shall minimize negative impacts on cultural resources by avoiding grading where such resources are known to exist. Prior to construction, a cultural resource survey by a qualified professional will be made of the trail alignment. Where it is deemed appropriate and use-related impacts can be avoided, trails may be designed to provide access to resources, such as historic sites.

**D - 3.8 Air Quality\*:** Parking surfaces and trail materials that reduce dust shall be used. Dust suppression techniques, including watering of disturbed lands, should be used in constructing Regional Staging Areas and Shared-use Trails to reduce dust during trail construction.

#### **D - 4.0 Related Trail Features**

##### **D - 4.1 Trail Structures**

**D - 4.1.1 Drainage Crossings\*:** Trails crossing creeks and drainages may require a bridge or culvert. Structures over water courses shall be carefully placed to minimize disturbance. Erosion control measures shall be taken to prevent erosion at the outfalls of drainage structures. (Reference: Figure G-9, G-10)

**D - 4.1.2 Trail Bridges:** Bridges should be a minimum of 5 feet wide on Single-use and Limited-use Trails and a minimum of 8 feet wide on a natural-surfaced Shared-use Trail. Bridges for paved Shared-use Trails should be a minimum of 12 feet wide and structurally capable of carrying maintenance vehicles. All bridges must have minimum 42 inch high railings when necessary. Fill over culverts should match the trail width. Bridge footings should be constructed outside of the stream's top of bank. (Reference: Figure G-11)

**4.1.3 Hardware:** All trail structures should be designed to be as vandal-proof as possible. Rounded framing members and recessed bolt heads and other hardware should be used for safety.

##### **D - 4.2 Access and Safety Barriers**

**D - 4.2.1\*** Bollards, boulders, logs, stiles, and/or other structures shall be used to prevent motorized vehicles from entering trail routes at any crossing of a public road right-of-way or at any trail staging area.

**D - 4.2.2\*** Safety barriers, grade separations, and/or barrier plantings shall be provided to protect trail routes along heavily traveled roads.

**D - 4.2.3** Gates installed for trail users should be four to five feet in width and able to be easily closed or self-closing. Vehicle gates, where necessary, should be signed to prevent blockage.

**D - 4.3 Signs:** Six types of signs should be considered in management plans for each countywide trail. These include:

**D - 4.3.1 Identity signs\*:** portraying information to include: trail name and distance to staging areas; intersections with other trails; or other points of interest along the trail route. Identity signs should be located at all staging areas, countywide trails intersections, intersections with other trails as appropriate, and intersections with roads.

**D - 4.3.2 Use signs:** portraying which types of trail use are appropriate, permitted, or prohibited on the trail; identifying accessibility conditions and other ADA related information; educating trail users about respecting private property along the trail route and/or any special land use considerations; restricting trail user parking on local streets; and restricting smoking and/or use of matches or lighters during high fire season. Use signs should be placed at each trail staging area. Information about litter control shall be included in use signs located at Regional Staging Areas and other trail access points.

**D - 4.3.3 Safety signs:** displaying warnings of upcoming underpasses, street intersections, blind curves, vertical clearances; providing information about water availability along the trail; advising trail users of the need to reduce speed or dismount and walk their bicycles or horses; warning of mountain lion or other wildlife danger; identifying any use restrictions during the fire season; and explaining the hierarchy of yielding among trail users. Safety signs should be located on an as-needed basis.

**D - 4.3.4 Private property signs:** posted at regular intervals in conformance with legal requirements to remind the trail user not to trespass.

**D - 4.3.5 Interpretive and protective signs\*:** indicating natural resource or historical points of interest or sensitive areas. Signs would be designed to identify specimen habitat types and to be educational by briefly describing resource characteristics and values.

**D - 4.3.6 Regional signs\*:** posted at strategic locations to direct regional traffic to staging areas and away from neighborhoods which may have trail access points but do not have sufficient parking to accommodate such use.

**D - 4.4 Potable Water\*:** Potable water for trail users will be provided at Regional Staging Areas and, ideally, at least every 5 miles along Regional Trails. Trail routes where no potable water is available for a interval greater than 5 miles will be posted with safety signs indicating such conditions.

**D - 4.5 Non-Potable Water:** Water for domestic animals permitted on the trail should be provided at Regional Staging Areas and, where possible, at an optimum of 5-mile intervals along Regional and Sub-regional Trails.

**D - 4.6 Sanitary Facilities\*:** Sanitary facilities shall be located at all Regional Staging Areas. Where necessary, based on anticipated types and volumes of use, sanitary facilities shall be located along trails.

**D - 4.7 Benches:** Benches for resting should be provided at regular intervals within 1/2 mile of Regional Staging Areas along trail routes in Valley and Foothills landscape settings. These should be located at places with aesthetic qualities, viewpoints, and particularly at the end of any long uphill stretches.

**D - 4.8 Stream Access Points:** In the detail design of any trail alignment parallel to a freshwater stream zone, access points should be identified for environmental education and interpretive programs. Such access points should be sited in coordination with the California Department of Fish and Game, the U.S. Army Corps of Engineers, and other jurisdictional agencies as appropriate.

**D - 4.9 Wildland Fire Suppression\*:** During preparation of design plans for specific trail alignments, the County Parks Department shall:

- review, in conjunction with the local fire protection services, available water sources at staging areas and/or along the trail, and provide for "draft" systems to allow fire suppression equipment access to emergency water supplies; and
- select plant materials and/or seed mixes utilized at staging areas or along trails for their low maintenance and drought and fire resistant characteristics to minimize additional fuel available to wildland fires to the maximum extent feasible.



**D - 4.10 Emergency Telephones\*:** Along trails located outside of public parks and along trails that pass through more remote areas or private lands, consider installing solar-powered emergency telephones at regular intervals. Where practical, locations should coincide with emergency access points and helicopter landing sites.

## **D - 5.0 Regional Staging Area Design**

**D - 5.1 Location:** It is preferable to locate Regional Staging Areas within designated parks and recreation areas so that management responsibilities may be shared. In any event, Regional Staging Areas should be located only where there is adequate management capability.

**D - 5.2 Security:** gates or removable bollards should be included at the street entrance to all Regional Staging Areas.

**D - 5.3 Facilities\*:** Regional Staging Areas shall contain, at a minimum, adequate parking, water supply and sanitary facilities, and emergency telephones and access and should include a full range of other facilities appropriate to the trail uses they serve. Such facilities might include: other general parking; identity, use, and safety signs; trail maps; and public telephones. Trash receptacles should be included at all Regional Staging Areas slightly beyond the beginning point of a trail where it is accessible to maintenance vehicles but not accessible to public vehicular access. Where equestrian staging is provided, facilities should include: horse trailer parking; watering troughs; hitching rails; and loading platforms designed to accommodate ADA guidelines. Storm water infiltration devices will be considered at staging areas to reduce potential water quality impacts. The Santa Clara Valley Water District Supplemental Well Standards will be used to determine appropriate design of the devices. The Santa Clara Valley Water District will be consulted to determine the need for such devices during the design phase for new staging areas. At a minimum, oil/grease separators will be required to be installed in the storm drain system of all parking lots with 50 or more cars, unless it is determined by reviewing water management agencies that such separators would be ineffectual at the specific site under consideration.

**D - 5.4 Visual Screening\*:** Screening berms, perimeter planting, and parking area trees that provide a canopy shall be used at Regional Staging Areas to visually buffer views into the staging area from sensitive visual control points, or to block views of incompatible surrounding land uses as seen from inside the staging area."

**D - 5.5 Wildland Fire Suppression\*:** Regional Staging Areas should be designed to optimize fire suppression capability in the area and to reduce the potential for wildland fire ignitions.

**D - 5.5.1\*** Design of Regional Staging Areas shall minimize the potential of accidental ignition of adjacent vegetation from cigarettes, catalytic converters, other vehicle parts, etc. by utilizing such methods as fuel modification to provide adequate clearances, paved or gravel parking, or maintaining adjacent vegetation to be free of dead materials. Defensible space should be maintained around all structures or improvements to fulfill the requirements of PRC 4291 and other regulations in effect at the time of design and construction.

**D - 5.5.2\*** Developed structures (such as restrooms) should meet the requirements of AB 3819 or other regulations in effect at the time of design and construction for roofing materials, overhangs, construction materials and techniques, glazing and other features that increase structure defensibility.

## **USE AND MANAGEMENT GUIDELINES**

### **M - 1.0 General Use Conditions**

#### **M - 1.1 Day-use Management**

**M - 1.1.1** Countywide trails are intended for day-use only except when within a public road right-of-way or when a special permit is obtained. When requested by a property owner, gates that provide access to private property shall be securely locked by the managing agency to avoid unauthorized entry.

**M - 1.1.2\*** Regional Staging Areas shall be managed as day-use facilities. Access gates or removable bollards to Regional Staging Areas shall be secured during night-time hours by the managing agency. Where Regional Staging Areas are outside of Regional Parks, such as associated with Community Colleges or private lands, individual management agreements shall be developed for joint operations of facilities. Specific management plans shall be prepared for individual Regional Staging Areas and reviewed on an annual basis. Existing staging areas at County Parks that specifically service only trails and all new Regional Staging Areas as identified in the Trails Master Plan should be identified and included in the County Sheriff's records as individual reporting areas. Information gained from these statistics should be used as a basis in annually establishing the level-of-service needed to police Regional Staging Areas.

**M - 1.2 Trails and Trail Users:** Shared use on trails is encouraged. Trail uses should be consolidated where safe within the same trailway, depending on the steepness, available right-of-way, user frequencies, and other conditions. Where it is unsafe and necessary to limit use on one trailbed, Limited-use and Single-use Trails should be kept separate and clearly signed.

#### **M - 1.3 Trail Use Restrictions**

**M - 1.3.1 User Types:** Where a Single-use Trail is developed or a Limited-use Trail is restricted to a particular type of user(s), the trail shall be clearly designated as such and shall be equipped with use signs and appropriate barriers to discourage unauthorized use.

**1.3.2 Use Conditions:** Where a trail, surrounding habitat, or adjacent land use condition warrants special notice limiting trail use, the trail should be clearly designated and should be equipped with use signs and appropriate barriers to discourage unauthorized use. Examples of limited use conditions include, but are

not restricted to: seasonal, daily, or hourly use periods; and requirements for special-use permits.

#### **M - 1.4 Trail Closure**

**M - 1.4.1\*** Reasons for trail closure include, but are not limited to: during trail construction, major repair, or seasonal maintenance; during seasonal periods critical to special status species; during high fire season; when a hazardous condition exists (e.g. landslide or washout); during periods of flooding or extremely wet weather where such weather renders the trail dangerously slippery or where use would damage the trail; where overuse threatens resource values; during special events; or where adjacent land uses may present unsafe conditions that could affect the trail user. Trail closures may be for all uses or for specific types of trail use based on the circumstances present at the time including failure to properly maintain the trail.

**M - 1.4.2\*** The Parks and Recreation Department shall decide whether or not to close County trails or trail segments. If the affected trail or trail segment remains closed for longer than ninety days, the disposition of the trail will be reviewed with the Parks and Recreation Commission and Board of Supervisors. Trail closures in other jurisdictions will be the responsibility of that jurisdiction.

**M - 1.4.3\*** Notice of trail closure shall be posted at all trail entrances and staging areas. Barriers shall be placed at strategic points where feasible.

**M - 1.4.4** Trail closure notices should include: the reason(s) for the closure; what steps will be taken to correct the problem; an estimate of how long the trail will be closed; and a telephone number to call for further information.

**M - 1.4.5** Trail closures should be as short in duration as possible; repairs shall be made as necessary. Prior to opening a closed trail, the Parks and Recreation Department shall make a determination that there is no danger to public safety or potential long-term adverse effects on the trail setting before noticing the trail as reopened.

**M - 1.4.6\*** When parking at Regional Staging Areas is at capacity, access gates shall be closed. Information shall be provided to visitors who may be turned away under such conditions about other areas and trails that would accommodate additional use. When capacity is reached on a regular basis, additional alternatives for dispersing use shall be considered including, but not limited to: positioning



staff at gates to direct traffic elsewhere; expanding existing facilities; constructing new facilities at nearby areas; establishing time periods for entry; and/or collecting fees.

**M - 1.4.7\*** The County Parks Department shall collaborate with CDF on the specific criteria used for procedures to temporarily close trails during high fire conditions. CDF receives statewide information from the National Weather Service Red Flag Program that alerts the possibility of critical fire weather patterns that produce extreme fire danger. A Red Flag Watch alerts potential for critical fire weather patterns during the following 24 to 72 hours. A Red Flag Warning alerts user agencies that critical fire weather patterns are occurring or imminent. This information should serve as one of the criteria for trail closure.

## **M - 2.0 Private Access to Public Trails**

**M - 2.1\*** Except where trail routes cross driveways and front entry walks, no private access to countywide trails or gates within continuous fencing/walls along the property line or trail easement shall be permitted without prior written authorization from the appropriate jurisdiction. A bond may be required by the jurisdiction in the amount of the actual costs to reclaim the private access in the event the access is abandoned.

**M - 2.2\*** Criteria that shall be used to evaluate the appropriateness of private access to public trails includes: visibility of access points; self-closing and self-locking features of gates; route alignment between the entry point and the actual trail tread; and maintenance costs and responsibilities.

**M - 2.3\*** In areas where public trails traverse private grazing or open lands, specific fence, gate, and crossing designs will be determined with the individual property owner. Fences will allow for wildlife passage and may be 6' chain link fence and/or barbed wire in conformance with State regulations governing such use. Wire, chain link, or metal pipe gates shall be installed in the fence to allow perpendicular access across the trail corridor for the convenience of grazing tenants or for emergency and service vehicle access. Underground cattle and game crossings at regular intervals may be used in conjunction with gates and cattle guards as determined by the needs of the individual landowner.

### **M - 3.0 Trail Monitoring and Maintenance**

**M - 3.1\*** A yearly inventory of all trail maintenance, including drainage, vegetation clearing, signing, surfacing, need for graffiti removal, and repair of structures, gates, fences, and barriers shall be done in early spring, prior to the heavy summer use period. Based on maintenance reports, trails shall be subject to closure or repair as warranted.

**M - 3.2** Short segments of trails may require permanent re-routing, due to landslides or other problems. The original route should be closed to use and reclaimed when a new route is provided. The managing agency should determine when such rerouting is necessary. Should re-routing involve private lands, all trail policies and guidelines shall apply.

**M - 3.3** Vegetation growth shall be cleared and obstacles shall be removed where necessary. Good pruning practices along trails shall be followed. Ground cover plants and low shrubs shall not be cleared except from the actual trail tread. Noxious plants (e.g. Yellow Star Thistle) shall be controlled along the trail in a timely manner.

**M - 3.4\*** Within the trail clearing limit, understory grasses and herbaceous annuals shall be inspected annually during the early summer months and prior to the fire season and, where appropriate, mowed. (Reference: Figure G-1).

**M - 3.5\*** Corrective work for drainage or erosion problems shall be performed within a reasonable period of time. Where necessary, barriers to prevent further erosion shall be erected until problems are corrected. Missing or damaged signs shall be replaced as soon as possible. Damaged structures shall be repaired as soon as possible. Damaged gates, fences and barriers shall be replaced as soon as possible. Trails shall be closed if corrective work can not be accomplished within a reasonable time frame. If monitoring reveals that undesirable soil compaction is occurring in sensitive habitats adjacent to trails, erection of barriers or other appropriate measures (such as trail rerouting) will be employed as needed to discourage off-trail use.

**M - 3.6** Where trails are paved, they should be swept periodically to keep them free of loose gravel, debris, broken glass and other litter. Damaged pavement should be replaced as soon as possible. Unpaved Shared-use Trails should be regraded as necessary to maintain smooth surfaces.

**M - 3.7** Brush should be used to cover bootleg trails, abandoned trails or shortcuts to discourage use until natural vegetation returns.

**M - 3.8\*** Periodic monitoring of known sensitive habitats near trails will be conducted to determine if unacceptable soil compaction is occurring. Sensitive habitats include: Salt /Brackish Marsh; Riparian; Wetlands; Serpentine; and Oak Woodland.

**M - 3.9\*** Maintain trails and staging areas in a manner that meets defensible space and fuel modification standards. The level of maintenance should be commensurate with the level of surrounding fuel loads/topography and adjacent values at risk, as well as meet relevant standards in effect for the specific locale.

**M - 4.0 Trail Reclamation\*:** Should there be an event that necessitates the permanent closure of a countywide trail, a management program to rehabilitate the trailway will be developed. Such a program shall include disking and replanting the former trail to a natural condition, and/or sufficiently blocking the trail with barriers to effectively prohibit use. Noxious plants (e.g. Yellow Star Thistle) shall be controlled along the trail.

#### **M - 5.0 Trail Patrol and Information**

**M - 5.1** The Parks and Recreation Department has responsibility for revising existing park maps to show up-to-date trail information, and to develop new trail maps as trail routes are opened. Trail maps should also provide trail use rules, emergency information, trail accessibility, and other pertinent information.

**M - 5.2** The Parks and Recreation Department has responsibility for patrol of all countywide trails within the County's jurisdiction whether by Department staff or by contract with related agencies or approved volunteer groups. On trails which extend outside the County's jurisdiction, cooperative agreements with appropriate agencies should be formed for trail patrol and maintenance activities.

**M - 5.3\*** Where Shared-use trails that pass through multiple jurisdictions permit, establish in conjunction with all jurisdictions involved, trail-specific bicycle patrols by the participating agencies or through contracts with the County Sheriff's Office or other agencies.

**M - 5.4\*** Along heavily-used trails, install traffic counters and include data in the County Sheriff's Office computerized reporting system to be correlated with patrol frequencies to determine needed changes in patrols based on usage.



**M - 5.5\*** Establish trail-specific patrols by Park Rangers and necessary contracts with the County Sheriff's Office for trails connecting parks that pass through private lands. Where the trail width allows, such patrols should use 4-wheel all-terrain vehicles equipped with emergency gurneys.

**M - 5.6\*** When preparing design and management plans for individual trail routes that connect County Parks and cross through private property in remote rural areas of the County, consider controlling and monitoring public use of the trail through the issuance of use permits.

**M - 5.7\*** Improve coordination between the County, MROSD and other appropriate agencies with respect to implementing trail closures, preparation of detailed design and management plans for trails, and formalization of mutual aid agreements. The staff of MROSD and other appropriate agencies provide services that in many situations can supplement the services that County park rangers provide.

#### **M - 5.8 Trail Supervision**

**M - 5.8.1\* Minimum Presence:** All countywide trails shall be patrolled to assure that they are safe and usable. A level-of-service approach shall be used by the managing agency, such that trails receive attention commensurate with that provided to that agencies' public parks. Where trails cross through private lands, specific trail patrols will be outlined in the trail management plan and periodically reviewed on not less than an annual basis. Objectives of trail inspections shall be trail safety and security, adjacent private property security, code enforcement, visitor information and education, litter control, and minor maintenance.

**M - 5.8.2\* Use of Volunteers:** To the extent feasible, certain aspects of trail supervision, such as trail safety and security, litter control, and information and education should be accomplished by volunteers. In any event, County personnel shall inspect the trails as outlined above.



**M - 6.0 Staffing\*** : Prior to developing and opening a countywide trail to public use, a trail management plan that identifies the level of personnel needed to operate and maintain the trail relative to the above guidelines shall be prepared by the lead agency(ies). Criteria to be included in the trail management plan include, but are not limited to:

- anticipated types and levels of use
- availability of police and fire protection
- trail patrols
- annual maintenance requirements
- emergency management allotments
- management agreements with other agencies
- anticipated use of volunteers or contract services

Prior to opening for public use, funding for a trail's maintenance in terms of staffing and equipment will be identified and obtained for the first fiscal year of a new trail's operations.

**M - 7.0 Noticing Requirements of Landowners:** Where a countywide trail route illustrated on the Trails Master Plan Map involves private property, formal notification shall be made to the landowner at the following times with regard to the County's interest in trails:

- upon adoption by the Board of Supervisors of any trail route designated as a "high priority" trail
- upon submission of an application by the landowner to the Central Permit Office, pursuant to the County's Trail Easement Dedication Policies and Practices, for:
  - a proposed subdivision / cluster development
  - minor land subdivisions
  - architecture and site approvals
  - a use permit
- upon the initiation by the County of its intent to develop a trail within an existing trail easement across private property; and
- when a Negative Declaration or Environmental Impact Report is prepared pursuant to the California Environmental Quality Act.

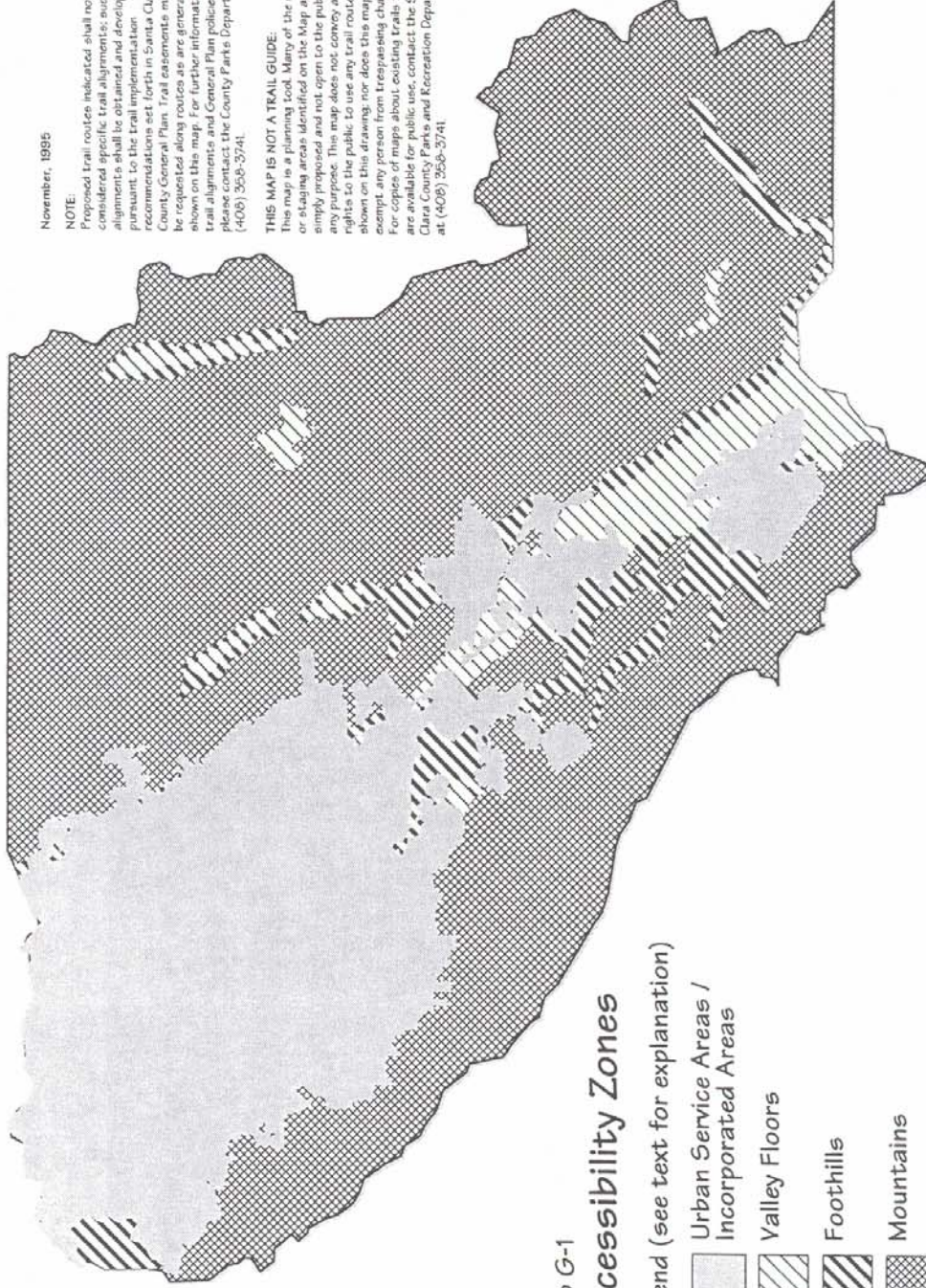
The construction of a single family residence or the remodeling thereof or addition thereto, the construction of a secondary dwelling unit or caretaker unit or guesthouse as may be permitted in the respective zoning district, the construction of outbuildings that are ancillary to a use permitted by right within a respective zoning district, or any minor use permit for a use that is directly or indirectly supportive of agriculture shall not be deemed as activities that would require noticing.

# Santa Clara County Trails Master Plan Update

November, 1995

**NOTE:**  
Proposed trail routes indicated shall not be considered specific trail alignments; such alignments shall be obtained and developed pursuant to the trail implementation recommendations set forth in Santa Clara County General Plan. Trail easements may only be requested along routes as are generally shown on this map. For further information on trail alignments and General Plan policies, please contact the County Parks Department at (408) 358-3741.

**THIS MAP IS NOT A TRAIL GUIDE.**  
This map is a planning tool. Many of the routes or staging areas identified on the map are simply proposed and not open to the public for any purpose. This map does not convey any rights to the public to use any trail routes shown on this drawing nor does this map exempt any person from trespassing charges. For copies of maps about existing trails that are available for public use, contact the Santa Clara County Parks and Recreation Department at (408) 358-3741.



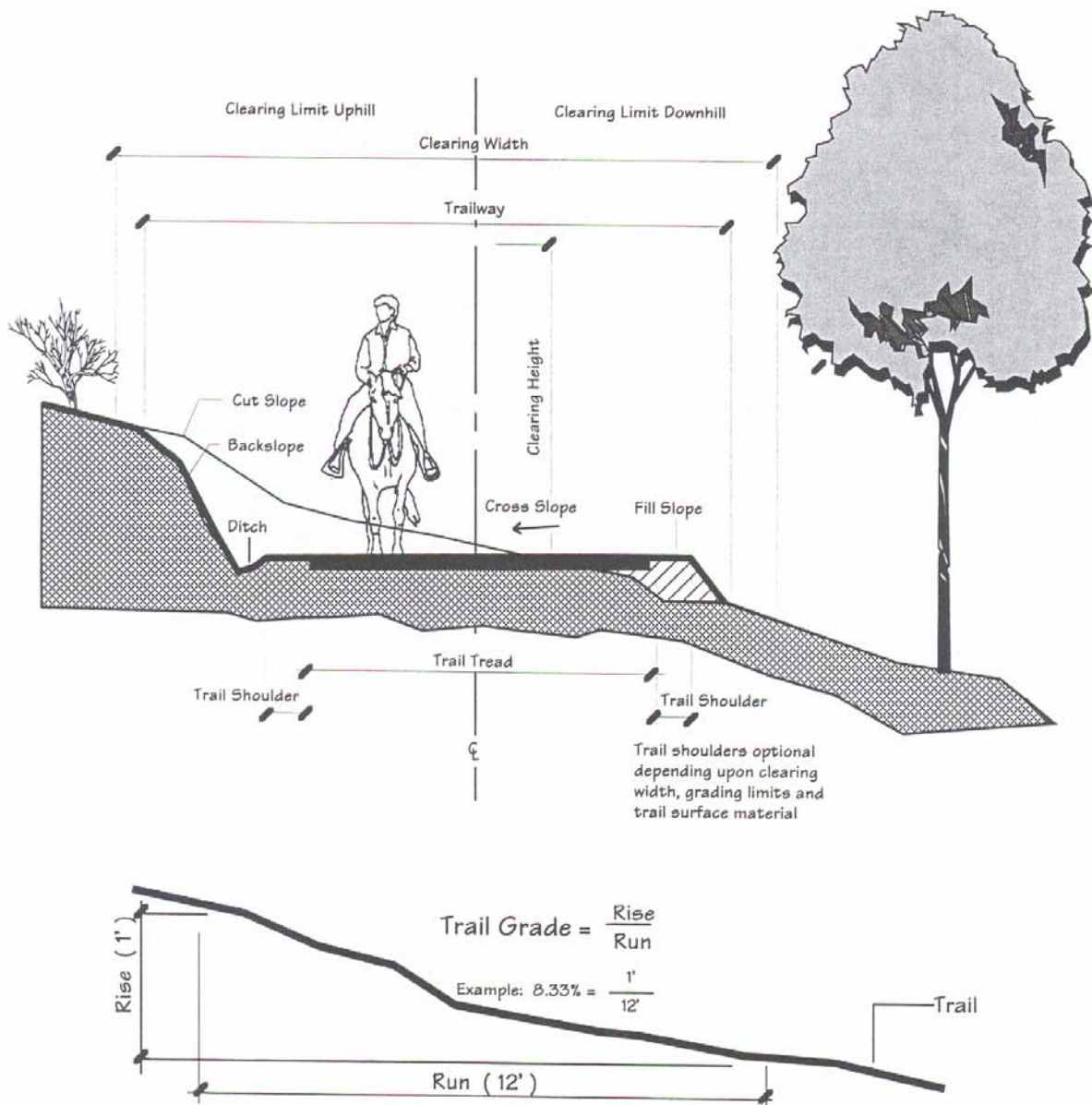
Map G-1

## Accessibility Zones

Legend (see text for explanation)

- Urban Service Areas / Incorporated Areas
- Valley Floors
- Foothills
- Mountains

## Trail Structure Terminology

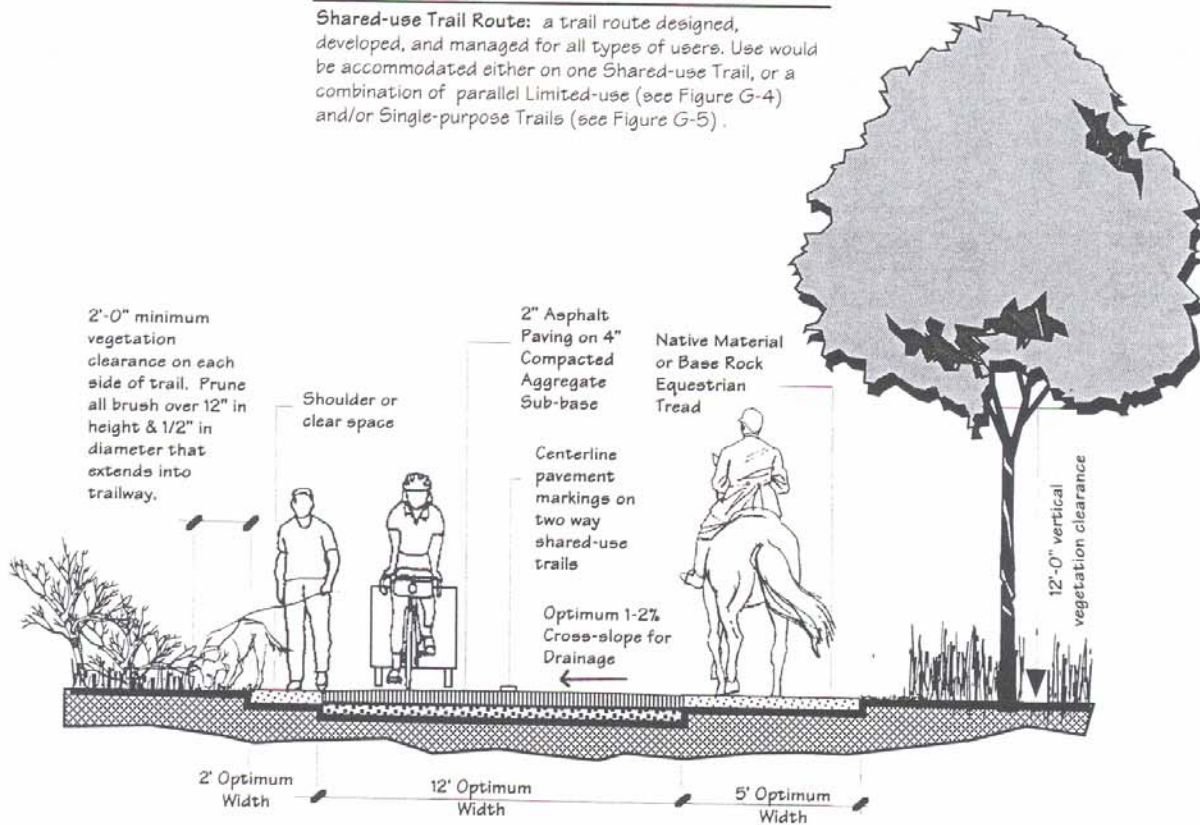




## Shared-use Trails

### Paved Tread - Double Track Trail Equestrians, Hikers & Bicycles

**Shared-use Trail Route:** a trail route designed, developed, and managed for all types of users. Use would be accommodated either on one Shared-use Trail, or a combination of parallel Limited-use (see Figure G-4) and/or Single-purpose Trails (see Figure G-5).



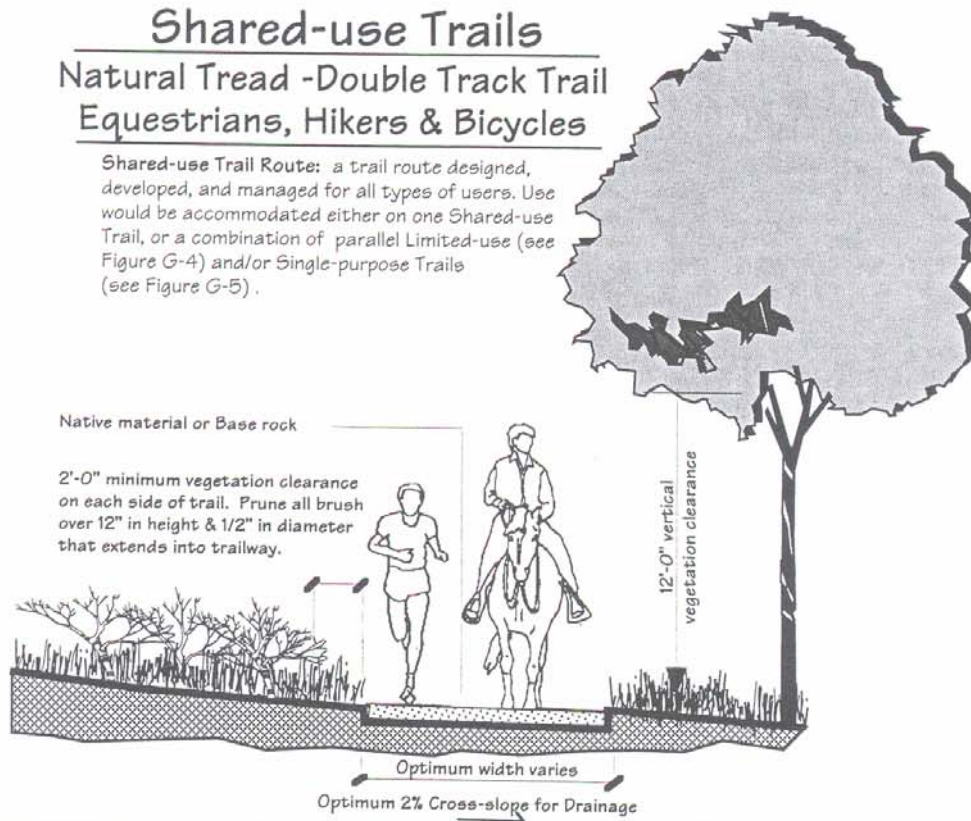
#### Notes:

- "Optimum:" the best or most favorable condition for a particular trail situation from the perspective of responsible management.
- Should a situation be encountered where the optimum width indicated can not be achieved or a staged development approach is used where narrower trails precede the optimum buildout width, mitigation measures should be used to provide for trail user safety. Such measures could include, but are not limited to: brush removal and clearing to augment lines-of-sight, trail pullouts at regular intervals, one-way trail management, signage, or dismounting requirements.

## Shared-use Trails

### Natural Tread -Double Track Trail Equestrians, Hikers & Bicycles

**Shared-use Trail Route:** a trail route designed, developed, and managed for all types of users. Use would be accommodated either on one Shared-use Trail, or a combination of parallel Limited-use (see Figure G-4) and/or Single-purpose Trails (see Figure G-5).



Landscape Designation	Typ. Maximum Trail Grade	Average Terrain Slope	Optimum Trail Tread Width
Valley Floor Areas	8.33%	0-15%	12'-0"
		16-30%	12'-0"
		>30%	N/A
Foothill Areas	10%	0-15%	12'-0"
		16-30%	10'-0"
		>30%	8'-0"
Mountain Areas	12.5%	0-15%	6'-0"***
		16-30%	6'-0"***
		>30%	4'-0" to 6'-0"

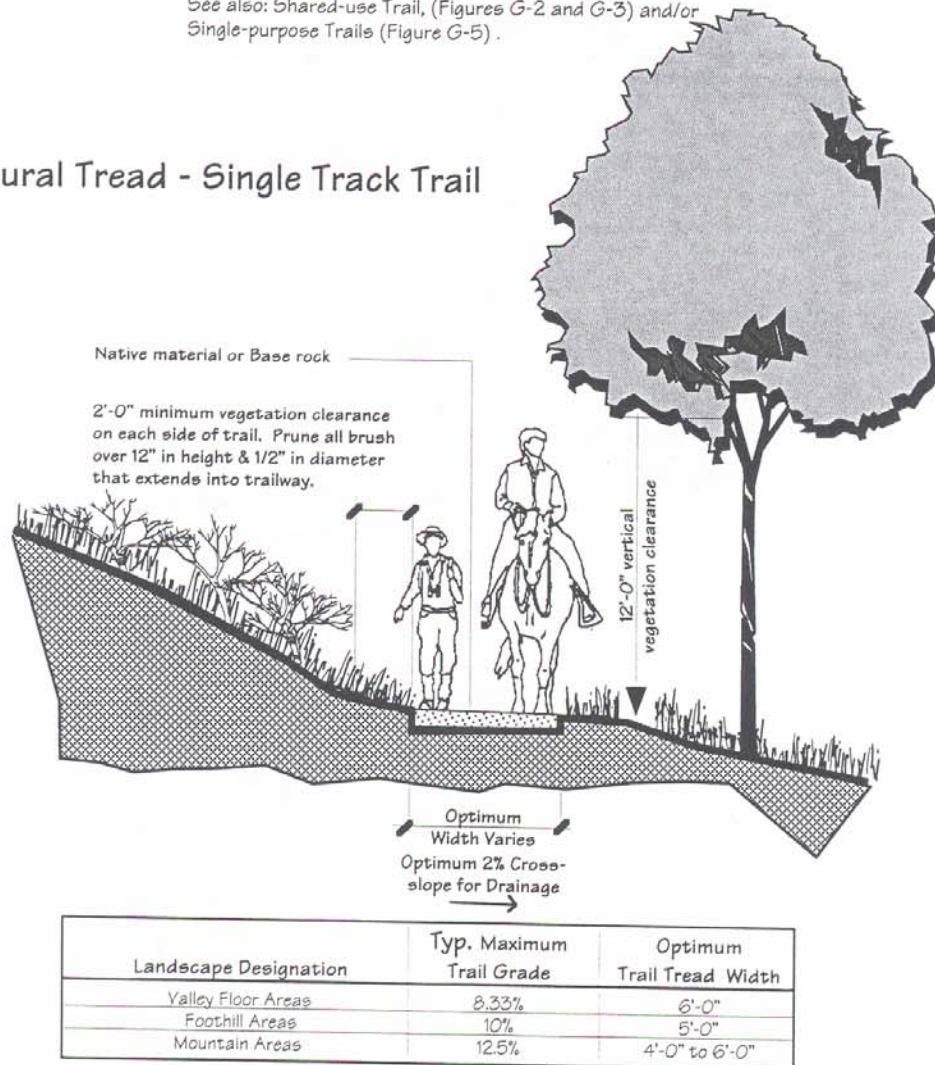
#### Notes:

- For trails typically outside of Urban Service Areas as shown on the County General Plan Land Use Map.
- "Optimum:" the best or most favorable condition for a particular trail situation from the perspective of responsible management.
- \*\* Should a situation be encountered where the optimum width indicated can not be achieved or a staged development approach is used where narrower trails precede the optimum buildout width, mitigation measures should be used to provide for trail user safety. Such measures could include, but are not limited to: brush removal and clearing to augment lines-of-sight, trail pullouts at regular intervals, one-way trail management, signage, or dismounting requirements.

## Limited-use Trails

**Limited-use Trail Route:** a trail route designed, developed, and managed for more than one, but not all types of users. See also: Shared-use Trail, (Figures G-2 and G-3) and/or Single-purpose Trails (Figure G-5).

### Natural Tread - Single Track Trail



#### Notes:

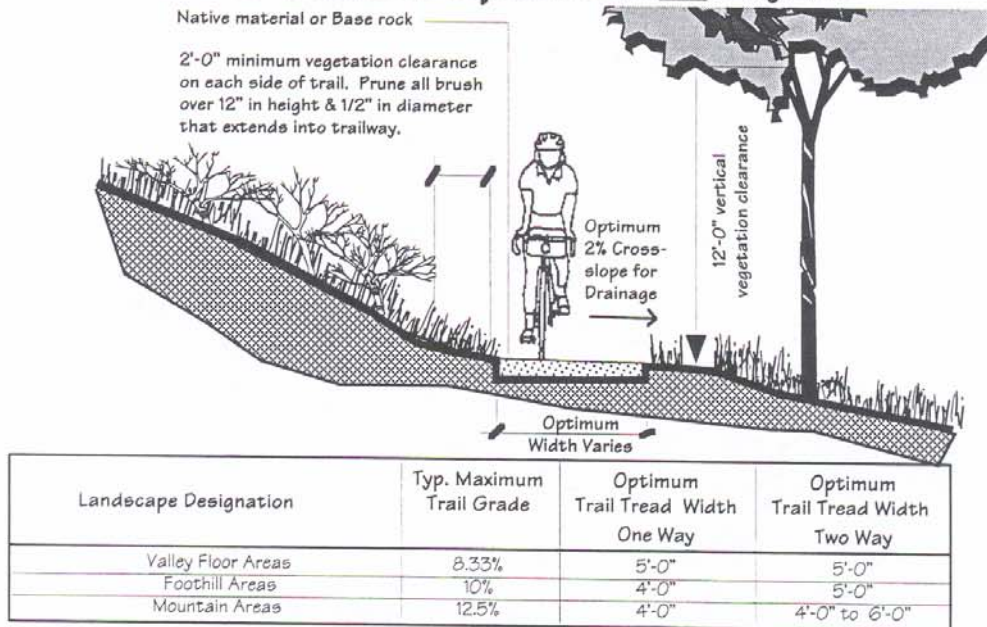
- "Optimum:" the best or most favorable condition for a particular trail situation from the perspective of responsible management.
- Should a situation be encountered where the optimum width indicated can not be achieved or a staged development approach is used where narrower trails precede the optimum buildout width, mitigation measures should be used to provide for trail user safety. Such measures could include, but are not limited to: brush removal and clearing to augment lines-of-sight, trail pullouts at regular intervals, one-way trail management, signage, or dismounting requirements.



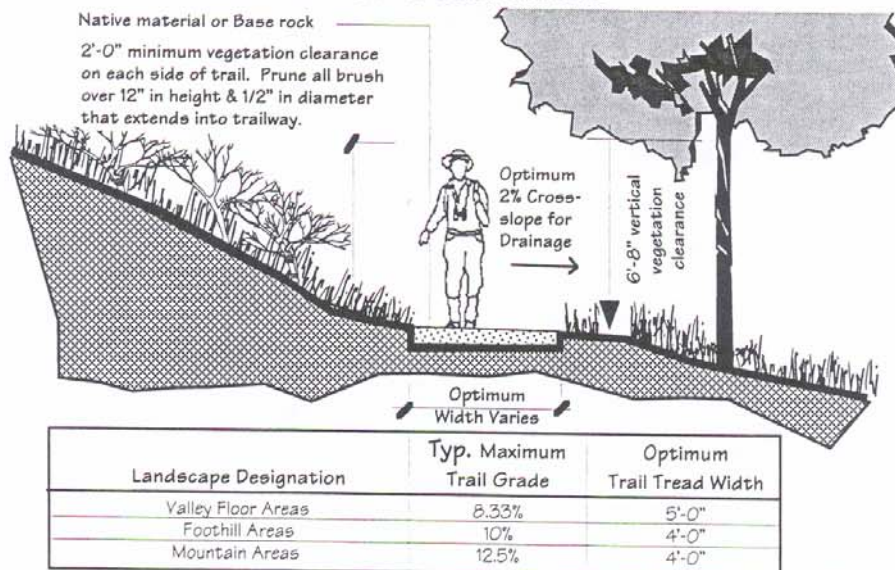
## Single-use Trails

**Single-purpose Trail Route:** a trail route designed, developed, and managed for one specific type of user. Typically, this trail is limited to either pedestrian, equestrian, or mountain biking use. See also: Shared-use Trail, (Figures G-2 and G-3) and/or Limited-use Trails (Figure G-4).

### Natural Tread For Equestrians OR Bicycles



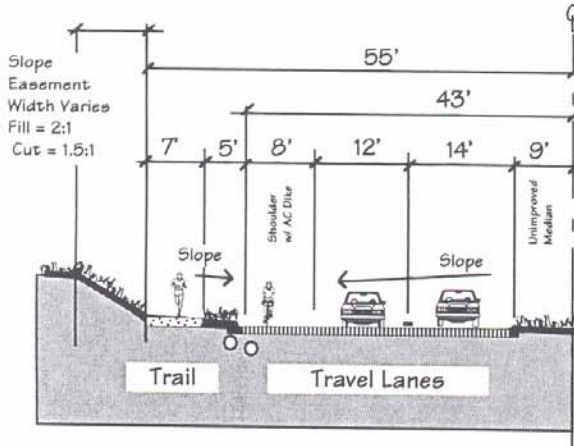
### Natural For Tread Hikers





## County Rural Areas

### 110' Road Right of Way (+slope easements): At Intersections

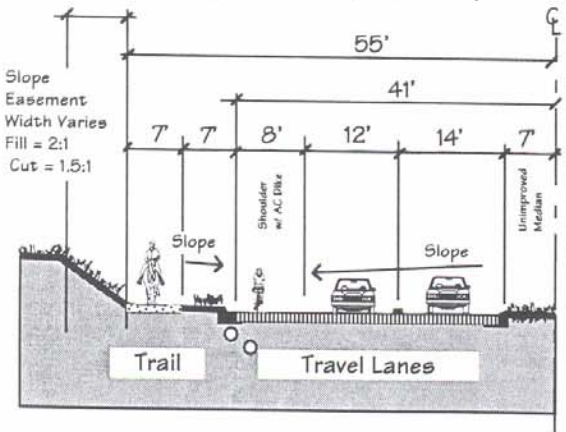


#### Notes:

- sub-surface drainage is required to provide space for a trail
- additional right-of-way may need to be obtained for trails in hilly / mountainous areas or where other physical constraints exist

## County Rural Areas

### 110' Road Right of Way (+slope easements): Between Intersections

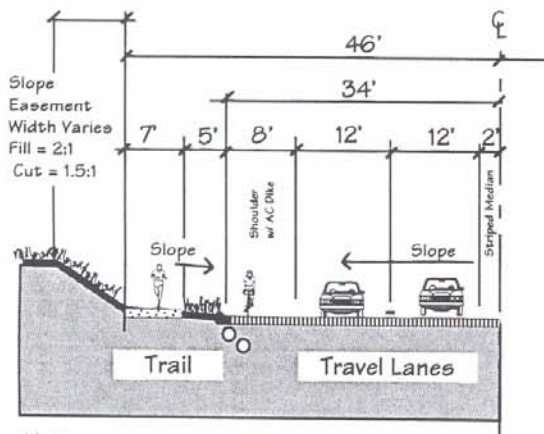


#### Notes:

- sub-surface drainage is required to provide space for a trail
- additional right-of-way may need to be obtained for trails in hilly / mountainous areas or where other physical constraints exist

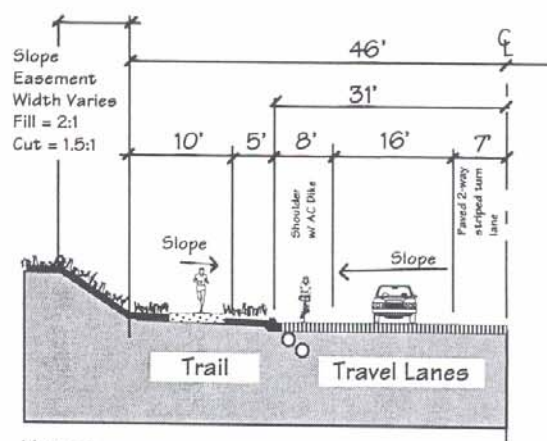
## County Rural Areas

### 92' Road Right of Way (+slope easements): Between Intersections



#### Notes:

- sub-surface drainage is required to provide space for a trail
- at intersections left turn lane may require additional right-of-way
- additional right-of-way may need to be obtained for trails in hilly / mountainous areas or where other physical constraints exist

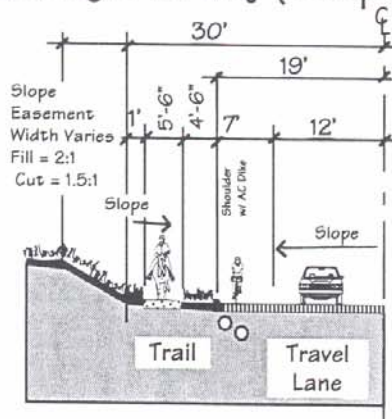


#### Notes:

- sub-surface drainage is required to provide space for a trail
- three lane option to widen space allotted for off-street trail possible for low volume roadways after approval of a Regional Traffic Analysis for buildout land use scenario
- additional right-of-way may need to be obtained for trails in hilly / mountainous areas or where other physical constraints exist

## County Rural Areas

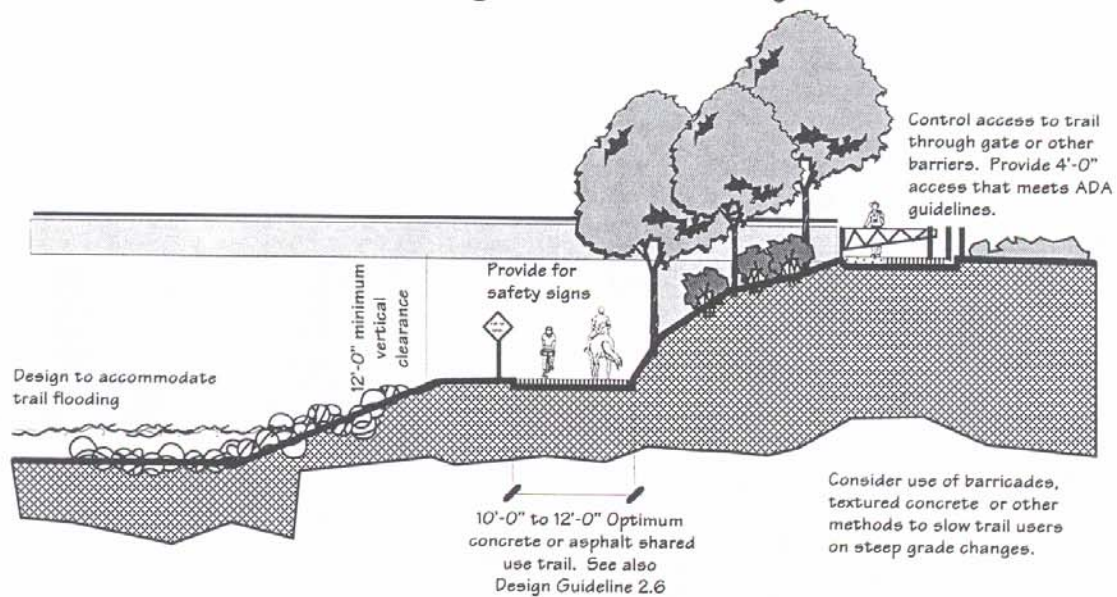
### 60' Road Right of Way (+slope easements): Between Intersections



#### Notes:

- sub-surface drainage is required to provide space for a trail
- right-of-way width at intersections and curves will vary based on traffic needs
- additional right-of-way may need to be obtained for trails in hilly / mountainous areas or where other physical constraints exist

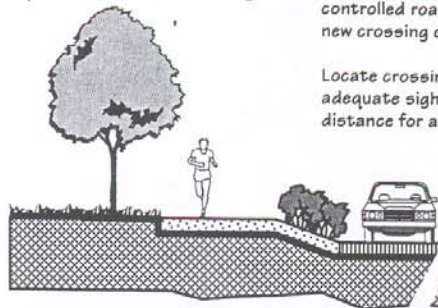
## Trail Under - Crossings at Roadways



## Grade Separation - Trail Undercrossings

# At-Grade Trail Crossings

## Typical Urban Crossing

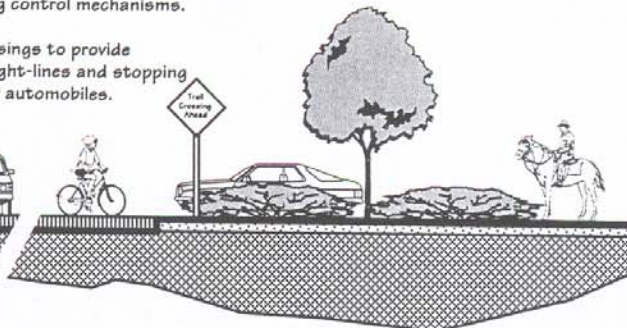


Encourage grade separation.  
Provide planted buffer or safety rails where separation is not feasible.

Encourage trail crossings at existing controlled road intersections or add new crossing control mechanisms.

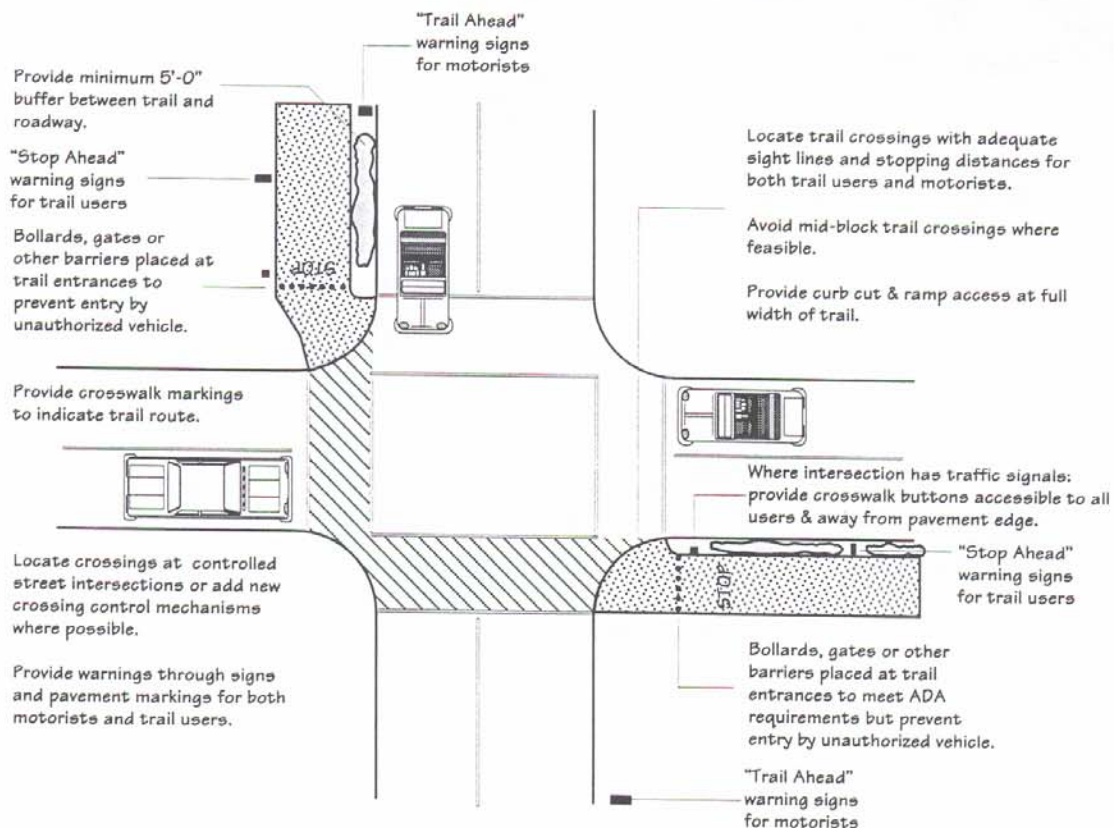
Locate crossings to provide adequate sight-lines and stopping distance for automobiles.

## Typical Rural Crossing



Provide minimum 5'-0" buffer between trail and roadway.

## Section through typical at-grade crossing



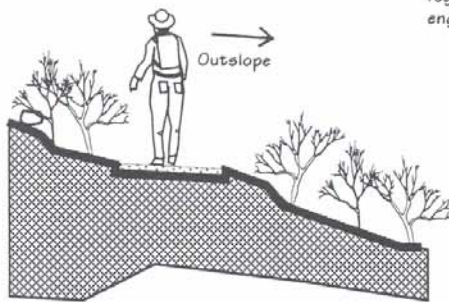
## Plan of typical at-grade crossing



# Trail Grading & Drainage

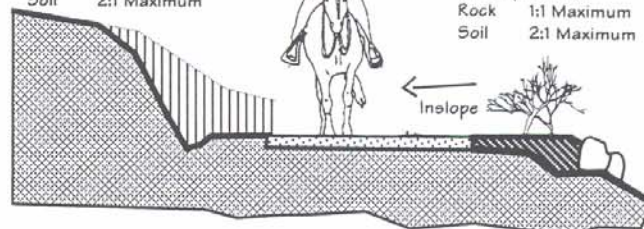
## Optimum Trail Grading

For short, relatively flat slopes:  
Provide for drainage by  
outsloping trail with 1 - 3%  
cross slope. Water bars may  
be required.



All slopes in excess of  
2:1 ratio must be  
certified by a  
registered civil or soils  
engineer for stability

Cut Slope Ratio:  
Rock 1:1 Maximum  
Soil 2:1 Maximum



Where required on long, steep slopes :  
Provide for drainage by sloping trail  
toward backslope and collecting in ditch.  
Waterbars / culverts are required.

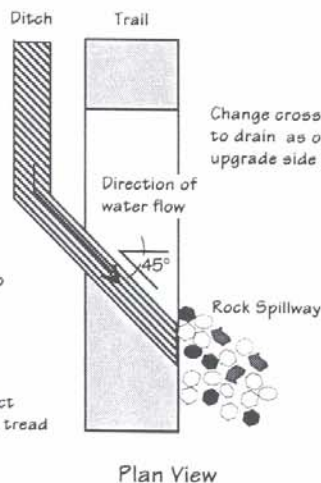
Connect ditch  
to culvert or  
waterbar

Fill Slope Ratio:  
Rock 1:1 Maximum  
Soil 2:1 Maximum

Remove embedded rock and stone that protrude more than 2"  
above the trailbed and recompact to 90% relative compaction

Shallow Ditch, Mound,  
Timber or Rock waterbar  
Extend minimum 12" into  
adjacent slope. Skew 45 to  
60° across trail.

Provide waterbars to direct  
minor rivulets across trail tread



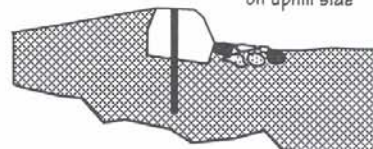
Plan View

Change cross slope of trail tread  
to drain as upslope on the  
upgrade side of the waterbar

Flush with tread  
on downgrade side

Anchor timber water  
bar with pin, rocks or  
stakes

Protrude 4" minimum  
on uphill side



Cross section of Timber Water Bar

## Detail of Water Bar for Natural Tread Trails

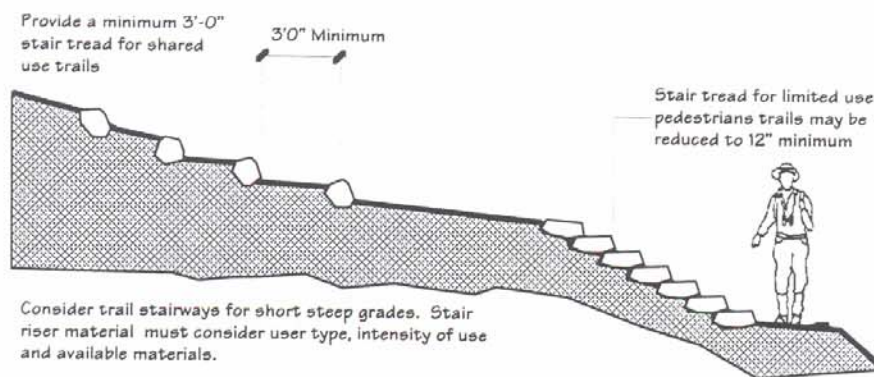
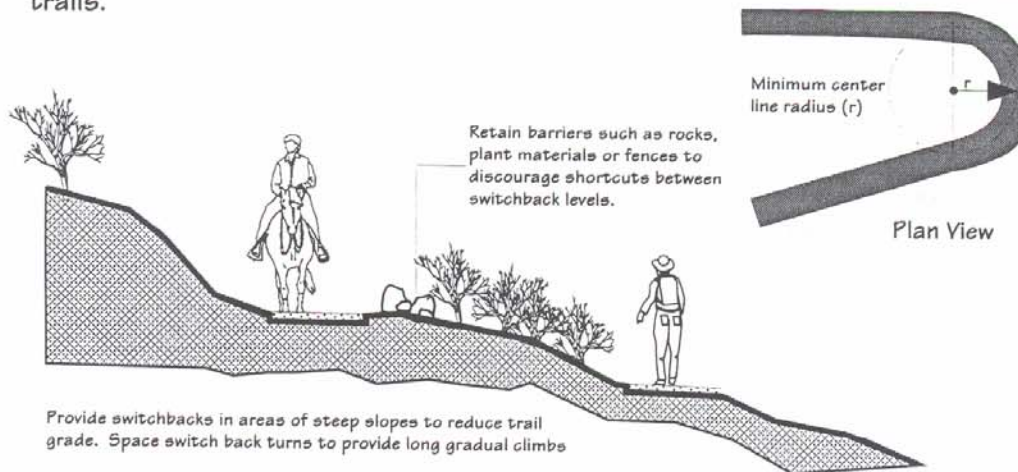
# Trail Stability

## Switchbacks & Stairways

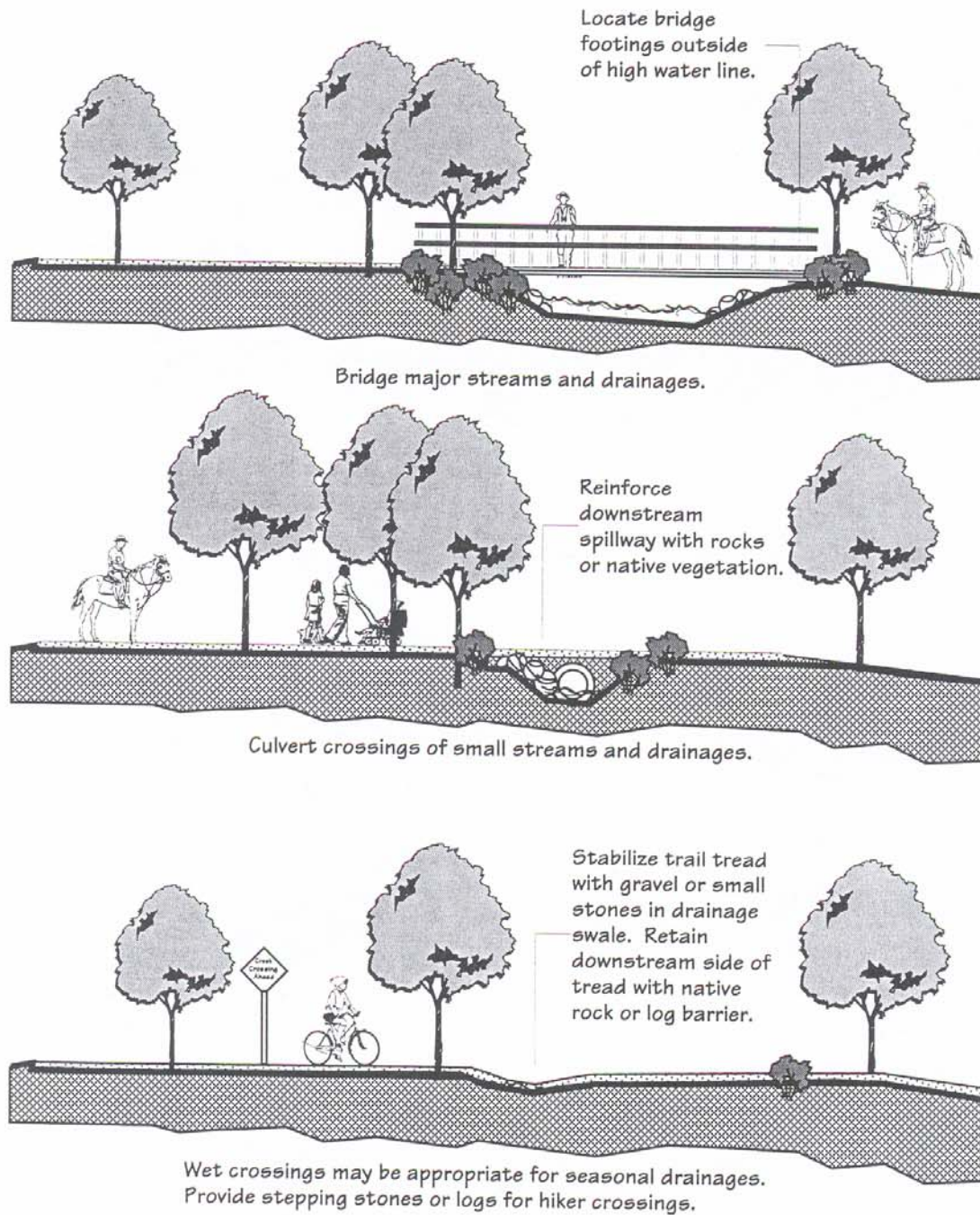
Use where severe constraints eliminate other grading options.

Optimum use on natural tread trails not paved trails.

Minimum Radius (r)	
Cross Slope	Radius
15-25%	25'
> 25%	15'



## Creek Crossings & Water Quality





# Trail Placement

Relationship to property lines, environmentally sensitive areas & residences

